UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/493,819	01/28/2000	Naoki Shibata	PM 266204	2698

21254 7590 12/09/2004

MCGINN & GIBB, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER	
WILLE, DOUGLAS A	

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 12/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/493,819	SHIBATA, NAOKI	
	Examiner	Art Unit	
	Douglas A Wille	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 October 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,5,7-11 and 18-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *25* is/are allowed.

6)☒ Claim(s) *1,3,5,7-11,14 and 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 7, 9 and 18 – 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edmond et al. in view of Duggan.

3. With respect to claim 1, Edmond et al. show a group III nitride light emitter (see cover Figure and column 4, line 57 et seq.) with a substrate 21, a buffer layer 23 directly on the substrate, a heterostructure layer 27, directly on the buffer, which can be $A_xB_{1-x}N$ (column 5, line 48) where A and B are Group II elements and x, y can range from 0 – 1 inclusive. Also shown is an active layer 25, directly on the heterostructure layer of $A_xB_{1-x}N$ (column 5, line 48). Duggan shows that for III-nitride devices the addition of a graded layer can be used to reduce the interface strain and minimize dislocations (see abstract) and shows that graded layers can be provided only between the clad layers and the active layers (column 7, line 64) and that the graded layers can be provided between all the layers. It would have been obvious to include the graded layers shown by Duggan for the advantage shown.

4. With respect to claim 7, Edmond et al. show a buffer layer of $A_xB_{1-x}N$ (column 5, line 22), which could be GaN.

5. With respect to claim 9, note that the claimed stoichiometry is within the ranges shown and the choice of a particular value is a matter of design choice.

6. With respect to claim 18, Edmond et al. show layer 26 is GaN.

7. With respect to claim 19, Duggan teaches (see column 4, line 18) that the graded layer can be provided on only one side of the active layer. Without specifying which side can be left ungraded, the disclosure cover both options and can include the case where only the lower interface is graded.

8. With respect to claim 20 the p-layer of Edmond is directly on active layer.

9. Claims 3, 5, 8, 10, 11 and 21 – 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edmond et al. in view of Duggan and further in view of Nitta et al.

10. With respect to claim 3, Nitta et al. show a blue light emitter (see Figure 1 and column 2, line 62 et seq.) where the active layer 104 can be InGaN (column 3, line 43) and the clad layer 103 can be InAlGaN (column 3, line 33). Note that the wavelength of the emitted light can be adjusted by varying the compound (column 3, line 52) and it would be obvious to vary the composition of the clad layer to provide sufficient optical confinement and to use a compound with Al to increase the wavelength range available. Note also that Duggan shows that the grading is complete with the interface being identical on either side (see for instance column 9, line 36) and thus provides lattice match.

11. With respect to claim 5, Duggan shows that for III-nitride devices the addition of a graded layer can be used to reduce the interface strain and minimize dislocations (see abstract) and shows that graded layers can be provided only between the clad layers and the active layers (column 7, line 64). It would have been obvious to include the graded layers shown by Duggan for the advantage shown.

12. With respect to claim 8, Edmond et al. show a buffer layer of $A_xB_{1-x}N$ (column 5, line 22) which could be GaN.

13. With respect to claim 10, note that the claimed stoichiometry is within the ranges shown by Nitta et al. and the choice of a particular value is a matter of design choice.

14. With respect to claim 11, in standard form, as described by the references quoted above, the double heterostructure shows the emitting layer as having a smaller bandgap than the surrounding layers and is inherent in the design.

15. With respect to claims 20 – 22, the p-layer of Edmond is directly on active layer.

16. With respect to claims 23 and 24, Duggan teaches (see column 4, line 18) that the graded layer can be provided on only one side of the active layer. Without specifying which side can be left ungraded, the disclosure cover both options and can include the case where only the lower interface is graded.

Allowable Subject Matter

17. Claim 25 is allowed.

18. Claim 25 shows a graded layer of AlGaInN where 0 and 1 are exclude from the subscripts with lattice matching on both sides and the p –cap is GaN. Such a structure is not shown in the prior art.

Response to Arguments

19. Applicant's arguments filed 1/22/04 have been fully considered but they are not persuasive.

20. Applicant's discussion of the combination of Duggan and Edmond et al. seems to be based on the conclusion that all of the layers of Dugan are to be imported into Edmond et al. but

as stated in the rejection above, the only feature of Duggan that is applied to Edmond is the teaching that the layer between the buffer and the active layer be graded. Thus the features of "directly on" are show by Edmond, and Edmond as modified by Duggan shows the graded structure.

21. Applicant states that grading would defeat the purpose of the Nitta et al. structure and states that it is known to one of ordinary skill in the art. This seems to be concluding that it is not possible to use a graded structure and at the same time select an operating wavelength for the device. This seems to be contrary to the ordinary and usual teachings in the art which suggest that a definite wavelength can be obtained for such a structure. If it could be shown that a definite wavelength could not be obtained from such a structure it would imply that Applicant's claimed invention would not have a definite wavelength.

Conclusion

22. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas A Wille whose telephone number is (571) 272-1721. The examiner can normally be reached on M-F (6:15-2:45).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Douglas A. Wille
Primary Examiner

December 6, 2004